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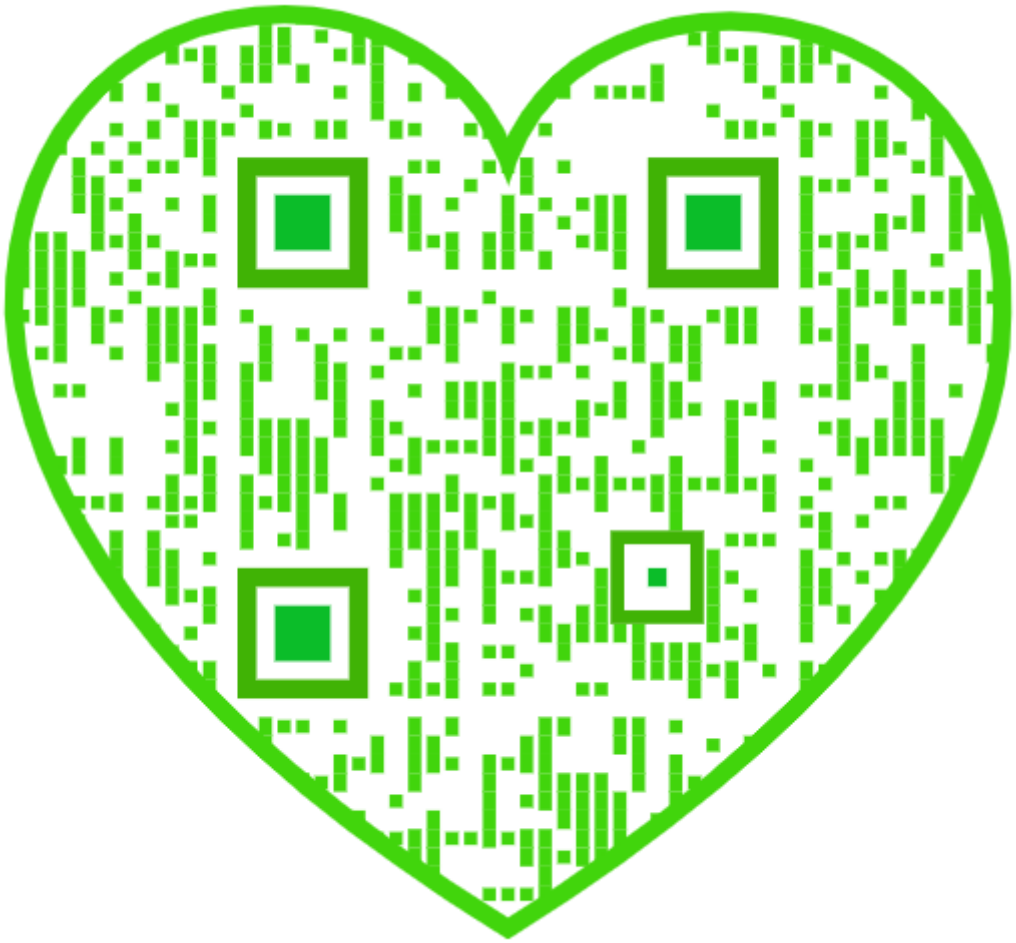

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PROGRESSIVE BEE CULTURE

OR

Apine Instincts and Labors Defined,

Illustrated and Systematized,

Upon a New Theory.

D. L. ADAIR, Hawesville, Ky.

1872.

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EXTRACTED AND COMB HONEY.

It has been known for a long time that bees hived in a large box, or a bee-house, would continue to work year after year and seldom swarm out, and it was of course also known that they would store a great quantity of honey, but in a form that was unsuited to marketing.

Since the introduction of the improved System of Bee Culture, many efforts have been made to take advantage of these facts in producing non-swarming hives, but all of them being based on erroneous conceptions of the causes producing these results, they have been failures. The addition to hives of extensive box room on the top, it was soon found, would not do it. The addition of boxes on the side, while it produced better results, failed to prevent swarming. The introduction of the Melextractor caused many bee-keepers to do away with boxes, and instead give additional room in the hive for frames, without separating them from the brood-nest. This has a great tendency to prevent swarming, but does not do it entirely, from the fact that the continued handling of the comb frequently produces disorganization, resulting in abnormal action on the part of the bees, and is the source of swarming, besides which, hives so constructed do not conform to the requirements of the bees.

If bee-keeping is to be made a success, it will not be accomplished by the use of the Honey Emptying Machine. Its limited use has already so depreciated honey that it is difficult to find a market for it at one-third the price of comb honey. In the condition of strained honey, it is necessarily brought in competition with the cheap syrups, not only from the sugar cane of the South, but of the Northern productions from sorghum, beets, and Indian corn, and when produced in such quantities, as it can and will be, will sink to their level or one-fourth its present meager price, while nice box honey in small packages will always find a ready market at a price that will be more remunerative than any production that is secured with so little labor to the producer.

The hive I now present has overcome all of the difficulties, as it gives the bee-keeper perfect control of the swarming impulse of the bees, gives them ample room to employ all the force of the hive, and has the surplus stored in cakes, each perfect in itself, that weigh from one and one-half to five pounds, as desired, that when taken out of the hive can be formed into attractive packages of any required size, ready for the market, and always command more per pound, over and above ordinary box honey, than can be obtained for a pound of extracted honey.

TO BEE-KEEPERS USING THE LANGSTROTH, OR OTHER, SIMILAR FRAME HIVES.

In order to enable all to secure the benefits of the "New Idea" Hive, I will furnish them with sample Langstroth hives or those of similar construction, arranged for frames in the center, and the ends filled out with my section honey boxes, with a right to use the honey boxes on any hive, for $10, or full directions for constructing their hives so as to add the honey boxes, with sample honey box of twenty to twenty-four sections that will hold thirty to forty pounds of honey properly arranged for being added to such hives, for $5. In sending orders it will be necessary to send the exact size of the frames used, and also the exact width and depth of the case, so that the boxes may be made to fit. The hive I send can have the bees put into it by simply removing the frames, bees and all, to it from the old case.

PROGRESSIVE BEE CULTURE.

BEE-KEEPING TWENTY YEARS AGO.

THE revolution which is now so rapidly taking place in the science of Apiculture, is as wonderful as unexpected. Twenty years ago, when the movable comb system was first introduced, those who adopted it thought they had reached perfection; and, when Mr. Colvin stated, in the Patent Office Report for 18 , that he had no doubt that an apiary might be made to yield fifty pounds of honey to each hive, but few believed it.

AND NOW.

Since that we have been progressing; slowly it may be, but certainly progressing, for by the use of the new appliances and the development of new facts, large apiaries have been made to yield an average of several hundred pounds, while single colonies have produced from 500 to 700 pounds.

ONE THOUSAND POUNDS AVERAGE.

At the meeting of the North American Bee-keepers Society, in December, 1871, one member offered to sell a large number of hives, to be paid for only on condition that he should, during the season of 1872, take ten colonies containing a quart of bees each, and from them secure 10,000 pounds, or at the rate of 1,000 pounds to each hive.

WHY NOT ALL?

If a single colony of bees can produce 500 to 1,000 pounds why should not all? In a year equally favorable, we can not see any reason to prevent, except the difference in management.

The revolution that Dzierzon initiated, when he constructed the movable bars, is still going on, and will only be complete when every healthy colony of bees is made, by intelligent management, to produce the maximum yield, whether that be 500 or 5,000 pounds.

HOW IS IT TO BE ACCOMPLISHED?

The important question will suggest itself to all, "How is it to be accomplished?" In general terms we may answer by saying: By a thorough understanding of the laws governing the actions of the honey-bee, and the adoption of such intelligent management as shall take advantage of those laws, which are as unvarying as the laws governing any of the forces of nature. Were it otherwise, we would have no confidence in bee culture ever being a success.

BEES NOT ENDOWED WITH REASON.

It will not do for us, when we fail to understand why bees act in a certain way, to say they do so from an exercise of reason. If we establish that they possess an intellect "*only differing in degree*" from man's, as some, even eminent naturalists, assert, we immediately make them as uncertain in their actions as men, and as unmanageable. If we endow them with sympathies and sentiments, as many of our teachers do, who indulge more in imagination than reason, when dealing with the hidden laws of bee life, we but repeat the old superstitions that for centuries formed the basis of bee-keeping, and at once clog the wheels of progress. Rational bee culture does not mean endowing insects with reason.

EDUCATING BEES.

Once establish that bees can be educated, and you admit that they can learn wrong as well as right, and that they have eaten of "the tree of the knowledge of good and evil," and we fear that their depravity would take as deep root as Adam's, which all the teachings of inspiration has failed to root out from his descendants; for it will only be at the millenium that human society will be made as harmonious as we now find that of the bee.

LAWS OF DESIGN.

When the lightning descending from the clouds selects the metal rod as its path, in preference to the broader brick or wooden wall of the house, no one thinks of attributing a discretion to the electric fluid; when bodies act chemically on each other and form crystals as perfect as the cells of the bee's comb, no one thinks of attributing to them reason; but all can see in such things proof of design in their creation, and comprehend what the Creator meant when he pronounced "all he had made very good."

BEES GOVERNED BY IMMUTABLE LAWS.

The evidences of design are not less perfect in the regular workings of the honey-bee. They are all reducible to certain rules that are as unvarying as the laws governing the mathematical sciences, for it is but reasonable to conclude, from the known regularity of such of their peculiarities as we have been able to comprehend, that such as have been considered so irregular as to induce the belief that they were the result of reason, are governed by the same immutable laws.

THE QUEEN NO QUEEN AT ALL.

We find in every normal colony of bees, one bee called generally a queen, a name we consider unfortunate, as it conveys a wrong impression of the offices she performs in the hive. She is simply the mother bee, with no attribute of royalty, and exercises no control over anything therein.

EGGS.

She has certain organs called ovaries, in which eggs are produced in a manner not substantially different from the seeds in the capsules of the poppy, or in the fruit of the tomato. Under certain conditions the eggs grow, and when

perfected in size and elements, they are cast off like seeds and are ejected into the cells. If the queen is perfect she has a little sac, which has been named spermatheca, in which is contained the seminal fluid. The eggs, when being laid, in passing its mouth absorb small particles or filaments of this fluid, through minute holes, and are thus said to be fecundated. In a normal colony such eggs always produce worker bees, and, although from the same eggs queens may be produced, it is only done when there is some derangement in the proper balance of the hive, and consequently is abnormal.

DRONES AN ABNORMITY.

If, from any cause, the eggs fail to be fecundated, they produce drones. The production of drones is always the result of an imperfect action of the organs of reproduction in the queen, and is an abnormity. It may result from several causes. If the queen fails to be fertilized, she may lay eggs and produce drones. When a queen gets so old that she loses her vigor, or the sperm sac is exhausted, she lays drone-producing eggs. Experiment has proven that if a queen be subjected to severe cold so that she is chilled, the result will be the production of unfecundated eggs. Other slight bodily injuries to the queen often produce the same result.

GENERAL CAUSE OF PRODUCTION OF DRONES AND QUEENS.

These are physical causes that pertain to the queen alone. The most general cause pertains to the whole colony, and is the result, as in the production of queens, of some derangement in the proper balance of the hive; and the same abnormal condition that causes the laying of drone eggs is always soon followed by an attempt to produce queens. In the spring of the year the queen is excited to laying, in proportion to the honey supply and the increase of temperature in the atmosphere. When honey becomes abundant in the fields, worker brood is matured rapidly, and the hive is soon filled with young bees, whose peculiar office it is to feed the larvæ in the cells, and also the queen. The hive is rapidly filled with honey, and consequently the laying room is contracted at a time when it should be enlarged to accommodate her increased prolificness; and she finds herself suddenly deprived of cells in which to deposit the fast accumulating eggs. The result is a physical derangement of the reproductive organs, and consequently drone eggs, which she is compelled to lay in the drone cells, if there be any in the hive.

The laying of drone eggs by the queen is nearly always followed by the building of queen cells. The Baron Von Berlepsch says: "When the queen deposits male eggs at unusual times, they (the workers) construct queen cradles and raise young queens." (*Am. Bee Gazette*, vol. i., p. 87.) He should not have qualified the assertion by saying "at unusual times."

LAYING WORKERS.

Drones are sometimes produced in a still more abnormal manner. A colony deprived of their queen, with no eggs from which to produce another, never fail so far as our observation has extended, to produce what are called "laying workers." They are the ordinary workers of the colony, and do not differ from them physically, in any respect. All worker bees have ovaries, like the

queen, though not so fully developed, and also a seed pouch, or sperm sac, which is shriveled and aborted; and although they can not be fertilized, and consequently their eggs can not be fecundated, they can, under certain circumstances, lay eggs; or, we should say, eggs are developed in their ovaries, and deposited in the cells in the same manner that the queen does it.

PLEBISCITE.

We are told by apicultural authors, that the colony, finding itself hopelessly queenless, hold an election, or, by some kind of resolution or agreement, elect one of their number as queen, and that she assumes the reins of government; but, not being of the "royal blood," or "blood royal," as some call it, she can only be the mother of common people like the drones. (Why she is not of the same blood as the queen we have failed to see.)

WHY WORKERS LAY EGGS.

A little deeper study into the peculiarities of insects, and bees in particular, would doubtless give us a very different explanation of this apparent anomaly. Certain of the young bees, at a certain stage of their existence, supply the queen with the proper food for the development of eggs, prepared similarly, if not identically, as they prepare it, by partial digestion in their stomachs, for feeding the embryo queen in the cell. When the colony becomes queenless, and there are no eggs or larvæ out of which to rear queens, they fail to have any place to deposit it, and perhaps feed it to some of the workers; or, if compelled to disgorge it, some of the workers eat it, and such of them as have their ovaries the most perfect are thus stimulated to the production of eggs, and, not being fecundated, they produce drones. There is no reason why the drones thus produced should not be as perfect as if produced by a queen.

PARTHENOGENESIS, AND AGAMIC REPRODUCTION.

The fact that living animals could be produced without the intervention of the male, is not confined to the honey-bee, but is known to be the case with many species of insects, and is very common among radiates, worms, and crustaceans. Leuckart has given this mode of generation the name of *Parthenogenesis*, and it is also known as agamic reproduction. It is a kind of budding process, analogous to the production of plants from buds without the intervention of seeds. The propagation of the strawberry and raspberry is agamic, as is also the potato, one species of lily, and one variety of onion. In fact, all buds are perfect infant plants, but those we have named multiply themselves agamically.

ALL EGGS ARE BUDS.

All eggs are buds, and it is not strange that they should be governed by the same laws that govern the vegetable bud; and there is no reason why the same budding process in the less perfectly developed worker bee should not produce as perfect a drone as in the queen bee. This theory also accounts for the anomalous fact, discovered by Dzierzon, that a pure Italian queen crossed with a common, or black bee, would produce Italian drones; while her female, or worker, progeny would be hybrid.

LAW OF VEGETABLE REPRODUCTION.

This law of reproduction in vegetables is taken advantage of by our nurserymen and gardeners in propagating desirable varieties of fruits, flowers, and vegetables, the bud always reproducing the same variety, while the seeds are liable to be crossed, and are not reliable.

A NORMAL COLONY OF BEES.

A perfectly balanced, normal colony of bees consists only of a queen and workers; and so long as that balance is maintained, there is no necessity for any other members being added.

ANOTHER FACT.

Another fact of great importance is, that so long as the balance is perfect no drone-comb will be constructed by the bees, nor will any queen cells be commenced.

AND STILL ANOTHER.

And we venture to assert another fact, that in such a colony the bees can generate wax and construct comb as rapidly as it is needed for the brooding of the queen and the storing of honey.

PERFECTION NOT ATTAINED.

With our present knowledge of the habits and instincts of the bee, we admit that such perfection is seldom reached in the management of bees, but we are sanguine in the belief that it can be attained. To do so will require that we should be thoroughly, intimately, and correctly informed of the natural laws governing all the operations of the hive, and of the offices performed by all its inmates.

WORKERS IN CLASSES.

We have spoken of workers collectively, as if they were all alike in capacity, when the fact is that they are naturally divided into classes, each class adapted to certain work, which the others are as incapable of performing as if they were different insects; and when we speak of a perfectly balanced colony we mean one in which there is the proper proportion of each class to do all the work necessary in its department at the proper time, to chime in with, and harmonize with the labors of the others.

A PERFECT COLONY OF BEES.

A natural prime swarm is, as a rule, a perfect colony; and if furnished with a hive that is perfectly adapted to their wants and properly managed, will continue so. In order, therefore, to see in what perfection consists, it is necessary that we consider the bees from the swarm to the time that the comb system is completed, and through all their works.

A NATURAL SWARM.

If we hive a natural swarm of bees in an empty hive, of such construction that we can observe and closely watch their work, we find that they suspend themselves from the top of the hive, or chamber, in which they are

placed, in as compact a form as possible, appearing as an inverted cone; but, in reality, the true, efficient, active force is composed of bees in the shape of a sphere, or ball, the bees, forming the inverted base, being stationed in that position for the purpose of suspending the true cluster.

A LIVING HIVE.

By a close observation we will find that the outside bees of the cluster are not a part of the active force, but form a crust, inclosing the active cluster; in fact, they and the suspending bees form a natural hive, inside of which the organized forces are working. By taking a small stick or wire, and passing it horizontally and suddenly through the middle of the cluster and letting all below it drop, we can, by looking quickly, see that the solid wall of bees is not exceeding an inch and a half in thickness, while inside it is not at all crowded, but that there is a hollow about three inches in diameter, and no more bees inside of it than can work on the new comb structure.

HOW THEY COMMENCE.

They commence working, at the point where the circumference of the hollow sphere touches the top of the hive, by forming a narrow neck of comb, at first not more than three or four cells wide. This they carry down, slowly widening, but rapidly lengthening, until they reach a point exactly at the center of the hollow. Here they establish a center from which they work. Cells are built in a circle around this center, and it soon becomes the widest part of the comb; but as it widens and thickens it gets heavier, and would break down if the stem were not strengthened, so that it gradually widened, until the comb at the center is about three inches wide, when the neck is equally widened.

HOW THEY PROGRESS.

The edges of the comb now touches the inside of the crust, and the crust recedes. Just at this time two parallel sheets of comb are begun, as before, and are run down opposite the center.

HONEY STORING.

When the first cells on the stem are about one-eighth of an inch deep, the bees begin to place honey in them, and continue to fill them as they are built up, until they get within one or two inches of the center; below that they place no honey.

THE QUEEN STARTS HER BROOD-NEST.

But as soon as the central cell is one-eighth of an inch deep, the queen lays an egg in it. She then goes around on the opposite side, and lays eggs in the three cells that are built from the base of the central one. She then returns and deposits eggs in the six cells surrounding the first one, and continues to keep the cells on both sides filled with eggs, as fast as they are ready to receive them, thus establishing the center of her brood-nest, at the center of the comb structure, and when the comb on each side of the first is brought down opposite the center, she embraces them in her circuit, thus giving her brood-nest a globular form.

THE HONEY DOME.

The honey storing bees keep the store cells above filled with honey down to the brood. As the sheets of comb are widened they come down lower, and as each additional comb-sheet is built they occupy more of it, thus storing the honey in an arch or dome over the brood.

BROOD-NEST LIMITED.

The work thus progresses and will continue in the same order for twenty-one days, if the space be large enough; at which time the brood-nest attains its full size, for, at the expiration of that time, the cells in the center, first filled with eggs, are vacated by the maturing bees, and the queen returns to the center to refill them with eggs; and as they are emptied in the same rotation in which they were filled, she continues to follow them up, going over the same ground every twenty-one days.

COMB BUILDING UNLIMITED.

The completion of the brood-nest does not stop the comb-building. That continues as rapidly as ever, but as it is not filled with eggs by the queen, the honey-gatherers keep it filled with honey, thus surrounding the brood with honey.

ALL WORKER COMB.

Let us now examine the comb that has been constructed, and we find that all of the cells embraced in the brood sphere, are of a regular size, and is all worker comb. The cells in the upper part, filled with honey, are most likely a size larger, and frequently irregular. So far there is no drone comb.

BEE-BREAD.

Around the brood-nest on every side, and below, there is found a border of cells that are neither filled with brood nor honey, but are partly filled with bee-bread.

THE QUEEN ON HER CIRCUIT—YOUNG BEES.

Let us again accompany the queen on her circuit, and note what occurs. The first bees that emerge from the cells, remain on the sheets of comb that reared them. For three days they eat nothing. Their alimentary organs are not matured, although their stomachs are filled with food which they received in the larval state. A part of this is taken up by the circulation, and is used in completing their internal organism.

EGGS HATCH IN THREE DAYS—HOW LARVÆ ARE FED.

At the end of three days, the eggs laid in cells from which they came, hatch, and the young bees disgorge the remaining contents of their stomachs into the cells as food for the young larvæ. They then begin to eat the bee-bread that we have said is placed around the brood-nest on all sides, which is taken into their stomachs, and after being partially digested, is given to the larvæ. For about four days or a little longer, they continue to feed the larvæ;

their growth being then completed, the nurse bees begin to eat honey sparingly, and become wax-makers.

WAX-WORKERS.

The bee-bread and honey they consume is no longer disgorged as food for the larvæ, but is thoroughly digested, and in the laboratory of their stomachs is changed into wax, which is secreted in glands (perhaps), from which, as it hardens, it finds its way into the wax-pockets under the abdomen. The first formed is perhaps used to cap over the larvæ they have been nursing. This period does not necessarily limit the capacity of the young bees as nurses, but it is probable that they can perform that office as long as they continue in their adolescent state, and are eaters of bee-bread, but the food not given to the larvæ is converted into wax.

COMB-BUILDERS.

As the wax accumulates on them, they gradually, following the course of the queen, recede from the center, and find room on the outskirts of the comb-structure for depositing their wax.

HONEY-GATHERING AND OLD AGE.

The bees that have been comb-building up to this time, pass out into the fields as gatherers of honey, to be stored in the comb as built by the new wax-workers; the latter, after passing their allotted time in that mechanical labor, in turn becoming honey-gatherers, and after laboring in the fields for about a month, and performing duty as crust bees, die of old age.

THE LIFE OF A BEE.

We thus see that there is a perfect system governing the work of the bee; that, contrary to former notions, which supposed that the different offices of the bee were directed, as a system of police in a government, by a head, and were executed by the exercise of reason and discretion, they are involuntary, and each bee in succession performs all the duties. As it increases in age, it is crowded outwardly by the development of others in the center. From a nurse in the brood nest, its labors are first transferred to the wax structure; thence to the gathering and storing of honey; and when it is no longer of use as a productive agent, it takes its place in the living wall that protects what it can no longer produce, and finally is cast off like the withered leaf.

EFFECTS OF WANT OF ROOM.

So far, we have gone n the supposition that there was room for the bees to extend their work in every direction, except up. But as that is seldom the case with the bees in hives, let us consider the effect of a failure of room in any direction. We have said that when the cluster is first formed, a part of the bees form a living hive or crust around the hollow in which the first work is done, and that as the comb-building progresses they recede before it. This they continue to do, swelling out like an India rubber balloon as it is inflated with air, always encompassing the comb. They are the hive proper. The

bees claim no occupancy of any other part of the hive, be it large or small, than is inclosed inside of this globular crust.

THE HORNET'S NEST.

This living crust has its analogy in other hymenopterous insects—for instance, the papery nest-covering around the brood-nest of the hornet (*Vespa Crabro*), which, simultaneously with the building of the first brood-cells, has its commencement, and soon assumes the shape of a globe surrounding the cell-structure of the nest. As the number of galleries and additional comb is built, it is enlarged until, from a ball the size of a boy's toy, it attains near a foot in diameter. The hornet, not being accompanied by a host of animals out of which to form a living wall, nature provides an instinct to produce a substitute in the paper crust that protects the nest.

MORE ROOM.

We will now suppose the bees to be placed in a hive ten inches deep, thirteen inches wide, and two feet long, and that the cluster is formed in the center of it each way. In an ordinary sized swarm, the brooding-center will be placed three and a half inches below the top; and if the comb be built across the hive, it will be equidistant from the sides and bottom, so that when the first sheet of comb is extended six inches from the center each way, it will have reached within one-half inch of the sides and bottom, which is as near as the bees will approach with brood-comb to a solid wall. The store-comb above will be joined to the sides.

THE CRUST GIVES WAY.

The crust, having receded to the wall and bottom, gives way and is broken; but as the solid walls and bottom of the hive take its place, no harm is done. Lengthwise of the hive the circle has been maintained, and the eighth and ninth sheets of comb have been commenced, which are twelve inches apart. Around them the crust is maintained. The cluster can extend no farther laterally, and is forced out toward the ends. The cluster is divided into two hemispheres, and the work extends toward the ends of the hive, pushing them before it.

CRACKS AND HOLES.

If there are any cracks or openings in the evacuated territory too small for a bee to pass through, they are carefully stopped up with propolis, as to leave them behind would disorganize the harmony of the operation. If large enough for a bee to pass through, a part of the crust bees are left to stop them with their bodies, many of them passing to the outside. If there are holes in the ceiling or top of the chamber, they are managed in the same way.

THE HIVE FILLED.

Thus the work progresses, until the hive is filled with comb, brood, and honey, the crust finally giving way, and leaving none thus engaged except such as are guarding the openings.

BEES IN THE HONEY-BOXES, AND "HANGING OUT."

Then, if there be honey-boxes on top of the hive, many of them will pass into them; others will be forced out at the entrance-holes, and "hang out," as it is called. The wax-workers, having no further work, follow them, and when enough join them in the boxes, they suspend themselves to the top and reorganize as

AN INDEPENDENT CLUSTER

in each box, and go to work as they did in the beginning, the same process of comb-building being repeated in miniature by each cluster, with this difference, that, the queen being left in the brood-nest below, the cells are not filled with brood, but are occupied with honey. Each cluster being small and disconnected, the whole of them fail to progress as rapidly as they did in the continuous chamber;

THE UNITY OF THE HIVE IS BROKEN UP,

The equilibrium is destroyed, and many disastrous results ensue.

MORE ROOM GIVEN.

Now, suppose we add to the length of the hive two feet more; we thus give the bees room to continue their work, but we find that if the entrance is at one end and we place the addition at the other, we only partially remedy the defect. If we push back the full sheets of comb and make the addition between them and the entrance, the remedy is complete, but it is better to make half of the addition to each end, as that retains the brood-nest in the center and enables the bees to continue their work in both directions.

WHEN AND HOW.

To illustrate our theory we have supposed the hive to be only two feet long at first, and watched the bees until they filled it and became disorganized. This would not be the proper course in managing them. The additional room should be given before the hive is entirely filled, and never, under any circumstances, should the bees be permitted to fill out to either end, for if they do, the harmony is interrupted, and if it continues, even for a few days, it will result in the beginning of queen-cells, and room given afterward will not always prevent swarming.

A HIVE TEN INCHES DEEP.

We have given the depth of the hive at ten inches, for the reason that with that depth we have secured the best of results; but, without proper management, we find that however much room may be given, laterally, disorganization will ensue, and the normal balance will be disturbed; to account for which it is necessary for us to notice another peculiarity of the bee, in constructing and renewing its brood-nest.

A HIVE THREE FEET DEEP.

To make it plain, we will suppose that the swarm was put in a hive that was three feet high and fourteen inches square. We find that they will com-

mence and carry on their operations from the top, as we have described in the horizontally long hive, for twenty-one days, or until the first brood matures. At the end of that time the central sheets of comb will have been extended down below the first brood.

QUEEN ALWAYS OCCUPIES THE BOTTOM OF THE COMB.

The queen will, in refilling the cells with eggs, lower her center and recede with her brood-nest so as always to occupy the bottom of the comb with it; the honey-storing bees filling the upper vacated cells with honey as the brood-nest sinks, so that when the hive is finally full of comb, the globular brood-nest is at the bottom, and the upper part of the hive is filled with stores.

BROOD CROWDED OUT BY HONEY.

In a hive only ten inches deep, the queen is necessarily confined to her first brood-nest, for as soon as it is fully occupied and once filled, the comb all around it is filled with honey and bee-bread, and if honey is very abundant in the flowers they will soon begin to encroach on the brood-cells, filling them with honey, and to that extent contracting the queen's brooding room.

THE REMEDY.

This is easily remedied, by at least once in every three weeks inserting in the center of the brood-nest at least three empty sections (or frames) to be filled with new comb; to make room for which the brood-chamber should be separated in the middle and pushed apart so as to admit them. The bees will rapidly fill them with comb, and the queen will occupy it with eggs. It is better to insert one section each week, than to put in all at once; but, when time is important, they can all be given at once, each time the brood-nest is filled.

From the theory here proposed it can be easily seen:

UNCERTAINTY OF FORMER DEVICES.

First. Why all bee-hives heretofore used, that required the surplus honey to be stored in apartments separated from the brood-chamber, have been so uncertain in their results.

LOSS BY SWARMING.

Second. Why bees in such hives swarm just at the time when honey is most abundant, and thereby lose the best part of the honey season.

WHY ATTEMPTS TO CONTROL SWARMING FAIL.

Third. Why all attempts at controlling swarming, either by the manipulation of the hive or its size, have been failures.

THE MELEXTRACTOR OVERRATED.

Fourth. Why hives that were constructed for the purpose of using the melextractor, produce such enormous yields, which has been erroneously attributed entirely to the use of that machine.

DRONES AGAIN.

Fifth. Why such quantities of drones are raised in hives.

SPACES BETWEEN AND AROUND FRAMES OBJECTIONABLE.

Sixth. It will show that all hives that "*have spaces between, around, or over the frames,*" are objectionable, as they require the maintenance of an extra force of crust bees to secure and keep up the normal temperature and dryness necessary to brooding, and are the constant source of disturbance of the equilibrium of the colony.

EMPIRICISM IN BEE CULTURE.

Seventh. It will show that what has been called scientific bee culture, is founded on empiricism, having isolated facts, and many of them false, for its basis, and what has been called a system is no sytem at all—the Dzierzon theory, upon which it is founded, being merely the discovery of a series of facts that, while true in the main, have been imperfectly understood, and attributed to wrong causes.

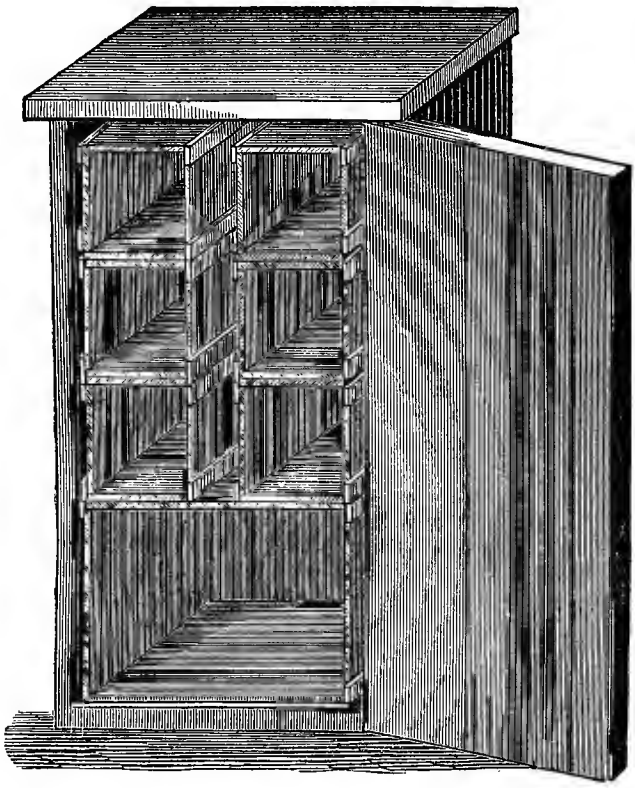
A FALLACY POINTED OUT.

Eighth. It will show the fallacy of that almost universal sentiment that attributes reasoning faculties to an insect, as on any other theory than this, we are compelled to do, to account for many actions of the bee, but when all of its irregularities can be accounted for as the result of fixed laws, such as we have tried to discover and point out, it is no longer necessary for us to show our own ignorance by attributing superior intelligence to the bees.

EXPERIMENTS AND RESULTS.

In the course of the investigations that have led me to the foregoing conclusions, I have experimented with almost every plausible hive that has been presented; and finding none of them unobjectionable, I attempted to construct a hive that would not do violence to the nature and instincts of the bee. The final result was the application of a new principle in their construction, which would do away with the inconveniences of the loose frame hive with spaces around them that had to be filled up with bees to maintain the colony in a proper condition. This I accomplished by my section bee-hive, which is simply the old square box hive, arranged so that it can be easily separated between each sheet of comb. It is composed of a series of vertical sections, which, when put together, form a box of themselves, and is perfectly adapted to the requirements of the bee.

I have been enabled, on account of the facilities its peculiar construction gave me for varying its shape and size almost indefinitely, and also for having it always in my power to observe the actions and works of the bees, to get it into a shape that takes advantage of all the natural instincts of the bee. In accomplishing this I have used it in fifteen distinct combinations, and finally have discarded all of them except the two known as No. 1 and No. 15.



ADAIR'S SECTION BEE-HIVE.

Patented August 27, 1867.

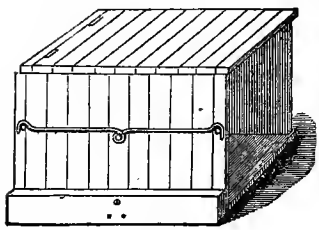


Fig. 1.

The No. 1 hive is composed of, first, the brood chamber, which is generally thirteen inches wide, fourteen and one-half inches long, and ten inches deep, inside measurement. It can be made of any size or dimensions, either way. For those who prefer it deeper (which I think unnecessary), it can be made narrower, so as to contain about the same space. The brood chamber is formed of nine vertical sections, or rims, each one and one-half inches wide. The top and bottom pieces are fourteen inches long, one and one-half inches wide; the side pieces are ten inches long, and the same width, all of them one-half inch thick. They are nailed together, one nail in each corner, the top and bottom pieces

to the ends of the side pieces, and projecting in front three-sixteenths of an inch, and setting back from the edge of the side pieces the same distance in the rear.

When two of these sections are placed together, the projections of one fit over the shoulders of the other, thus holding them true, horizontally. In addition to the nine sections, there are two other sections, or rather frames; both of which are made of strips same thickness as the sections, one one-half an inch wide, in which is inserted a glass 10x14 inches; the other of pieces one-half inch wide, with a back of the full size of the frame nailed permanently on it, so that when one is placed on each end, the box is closed at both ends. The back is ordinarily of thin boards or lath, but for winter it is better to form it of a layer of straw held in the section by strips of lath nailed on the back of the section, and also on the inside, setting back one-half inch from the front, as shown in Fig. 2. The straw, A, is cut to go inside of the section crosswise, and after nailing on the strips at the back, the section is laid down and the straw placed evenly in it, so that when slightly pressed down by the inside strips, they will set back about one-half inch, leaving the holes clear. It should not be pressed so heavily as to mash the straw, as the dead air in the cells is the best non-conductor, and it should be loose enough to permit a slow circulation of air, but not a draft. A similar section should be prepared for the front, and at the approach of winter the section containing the glass should be taken off, and the straw front substituted until spring. The straw will absorb any excess of moisture, and give all the ventilation necessary, even though every other hole be closed, while the bees will be kept warm.

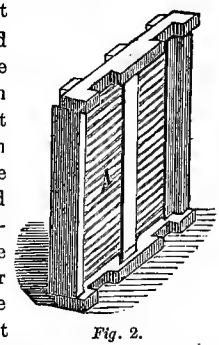


Fig. 2.

When the nine sections, and back and front frames, are placed together, a side strip two inches wide, one-half inch thick, and fifteen inches long, is fastened on each side at the top, by a screw and two nails in the center section, leaving the other sections unfastened, so that they can be slipped out and in, without taking off the side strips, as formerly. As first constructed, there were four side strips, two on each side, but two are sufficient. The whole is held together by two wire hooks on each side, which hook over screw-heads in the center section, and also over screw-heads in the end sections. The cut represents but one continuous wire wrapped around a screw in the center section. It is better to have them separate, and to have them of different lengths, so that, when it is desired, the chamber may be contracted or enlarged by using shorter or longer hooks.

As first constructed, the brood chamber had the back and glass put into the end section, which did not leave room to build comb in them of full thickness, and give room for the bees to pass outside of it. Since the addition of the shallow sections or frames on the ends, the bees build all of the comb perfect, without obstructing either of the end frames, and they can be removed readily by raising the hooks and slightly prying with a knife-blade.

The back frame has two holes, three inches long, and half an inch wide, one

and one-half inch from each end of the bottom and top pieces, and five inches apart, for entrance-holes, and passages to the honey-boxes.

Square guides of wood, ½x½ inch, are placed in the center of each top piece, with a corner or angle down. The bees do not fail to follow them once in fifty times, and then only in case of weak or disorganized swarms.

When pieces of honey comb can be had, four to eight inches long, and one inch or more in width, the guides may be left out, and the comb fastened to the sections, at the proper places, by first brushing on some hot melted resin, and, while warm, pressing the comb against it in proper position, which will fasten it tight.

If you have not sufficient comb to put in all the sections, put it in every other one, or every third one, and place the wooden guides in the others. Any comb that is composed of worker cells will do, even if old and black. In cutting it up into strips, use a thick knife that will retain heat, and frequently dip into hot water, to keep it hot, and remove the wax that will accumulate on the blade.

SECTION HONEY-BOX.

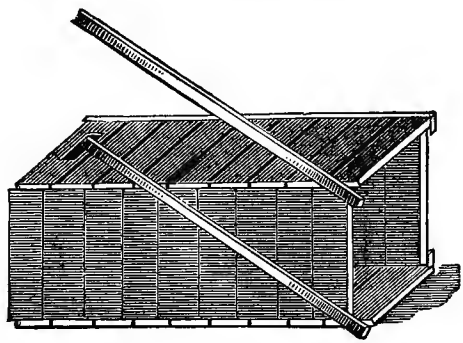


Fig. 3.

Second. The *honey-boxes* are formed of similar sections, only varying in size. The top and bottom pieces are six inches long; the side pieces, five inches long, are put together in the same way, with the same number of sections, and are of the same length as the broad chambers. The pieces are one-fourth of an inch thick. The back end is closed by a piece five and one-half inches square, sprigged to the top and bottom pieces of the end section. The front end is closed by a piece of glass 5x6 inches. One passage hole is cut in the front side of the top, and one in the bottom piece of the back section, three inches long and one and one-half inches from each end. Guides are used as in the brood-chamber, but it is better to use comb guides, as the wooden guides are in the way of cutting out the honey.

Four honey-boxes are used on No. 1 hive. Two set on the brood-chamber, with the passage holes corresponding with the passage holes in the top of the

brood-chamber; the other two are put on the top of the first two, with the passage holes corresponding. The top passage holes are closed by tacking oer them thin wooden strips.

The bees pass through the lower tier of boxes to get to the others. Four boxes, of the size used, will hold about fifty-two pounds, or about one pound to the inch in length. The two end sections should be made of pieces two inches wide, to give room to build the comb and leave a passage around it, or narrow sections or frames should be added as in the brood-chamber, as shown in the cut figure 4.

HONEY-BOX OPENED OUT.

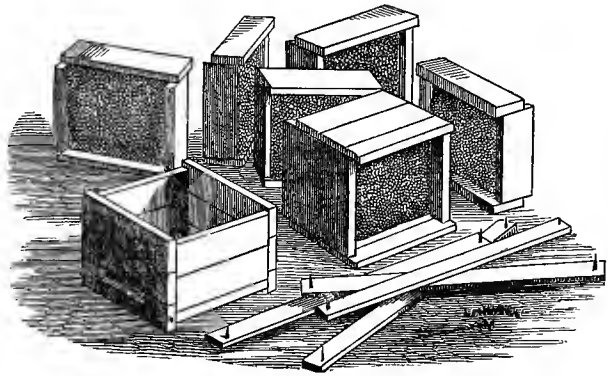


Fig. 4.

All of the sections may be made two inches wide, in the honey-boxes, if comb guides are used; but if wooden guides, not over one and a half inches. It is better, however, to have all the sections uniformally one and a half inches wide, as the comb will always be built more perfect and straight in them.

The bees enter from the back through grooves running under the brood-chamber, which they enter from the bottom, thence through the passage holes to the first tier of boxes, and through them to the second tier. They will work in the lower tier first; when they are half filled they are raised to the top and the top ones brought down and placed under them. This creates a vacancy between the stores of the hive, which the bees hasten to fill. By this means four boxes will be filled nearly as soon as two, thus nearly doubling the supply of honey.

Third. The case is made of inch boards, sixteen inches square, and in No. 1 hive is two feet high inside—the front closed by a door seventeen by

twenty-five inches. The door is one inch wider than the inside of the case, so as to shut against, instead of inside of, the jamb, to prevent a crack in dry weather and its getting tight in damp, from shrinking and swelling. The bottom board is sixteen inches wide and nineteen inches long. The two side pieces are twenty-five inches long, one of them seventeen, the other eighteen inches wide, that the door may shut over one and be hung to the other, and are nailed to the ends of the bottom board, and also to the side of the back piece, which is sixteen inches wide and twenty-four inches long, all even at the top. The bottom board projects two inches at the back, for an alighting board, and is beveled off to shed the rain. It sets back one inch (the thickness of the door), from the front on one side, and even on the other. The entrance holes are cut into the bottom board one-half its thickness, three inches wide, and extending back five inches. They are five inches apart, and two and one-half inches from the ends, extending under the back of the case, and two inches further. A wooden strip, twelve inches long, three and one-half inches wide, and one-half inch thick, with two holes three inches long, one-half inch wide, one inch from the front and two from the back, one-half inch from the ends and five inches apart, is nailed over the holes in the bottom board, inside, against the back. The bees pass in under the back board and under this strip, to pass through the holes, which, when the brood-chamber is in place, will correspond with the entrance holes in its bottom. Two strips, one-half inch square, are nailed on the bottom board, from front to rear, twelve inches apart, so that their back ends come against the end of the entrance strip, just described, upon which the brood-chamber sets, and slides in and out, and which raises it up to the level of the entrance strip. Two other strips, one-half inch square and eighteen inches long, are nailed against the back board, inside, to keep the brood-chamber and honey boxes from going back to the back boards, for the purpose of leaving an air space between them and the back, and the case being larger than the brood chamber on every side, the said air space extends all around as well as under it. These strips do not extend to the bottom by six inches, thus leaving a space for air to circulate around the brood-chamber.

Ventilation of the case around the brood-chamber and honey-boxes is secured by boring a hole in the case between the two entrance-holes in the back board of the hive, one inch from the bottom, and another of same size one inch under the top board. These holes have nailed over them, on the inside of the case, pieces of wire cloth, or pieces of tin perforated with holes, so as to let the air pass, and at the same time exclude insects and vermin. The holes could be placed in any other side of the hive, but in the places named they will not admit light to the glass ends of the boxes. These holes are closed in cold weather by means of slides, or buttons hung on screws, so that they can be turned to cover them on the outside.

The case is generally made of wood, but, unlike any other hive, it can be built of bricks, concrete, adobe, lath and plaster, straw, stone, paper, and other material. When built of brick it is substantial, durable, and comfortable to the bees; and when three cases are built, one on another, with the top neatly finished off and covered with vines, it becomes an ornament to the door-yard or flower garden.

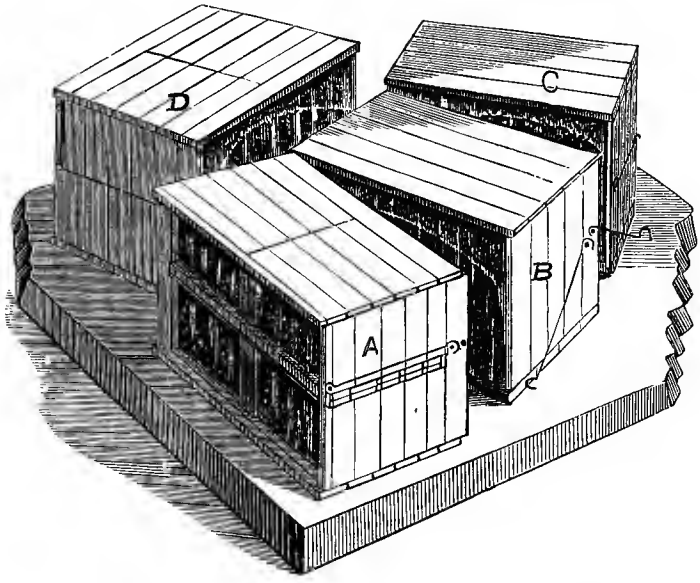


Fig. 5.

THE No. 15, OR "NEW IDEA" HIVE.

After what I have written hereinbefore, it is, perhaps, unnecessary to describe the peculiarities of this hive, as its features are incidentally given in connection with the theory upon which it is based. It is, however, only a new combination of the patented principles of my other hives, differing, however, from them in being composed of a single continuous chamber, formed of sections, as described in the No. 1, and having the chamber resting on a bottom board, and inclosed by movable sides and top.

No. 15 A is three feet long, and has the chamber formed of eleven full sections, ten by fourteen inches, in which the brood-nest should be located. In the cut (Fig. 5) is shown the parts of the chamber unhooked and opened. *B* and *C* show nine of the brood sections, while two others are shown attached to *A* and *D*. The part *A* is composed of twenty sections, one-quarter the size of those in the brood-nest, each five by seven inches, four of them occupying the room of one large one. They are nested into one of the brood sections and hooked together, forming four honey-boxes, with no division between them and the brood-nest.

D shows a corresponding compound section, formed of sections half-size. It is not intended by the arrangement of the cut to convey the idea that this combination of quarter and half sections is always used, but to show that, notwithstanding the hive is a unit, having really only one apartment, any desired or desirable size of section or box can be used without interfering with its unity. For the Melextractor, I construct the whole hive of full sections, but as, with a proper hive like this, it is more profitable to secure box honey than extracted, I use but few hives in that way.

The quarter sections, when filled with honey, weigh from two to two and one-half pounds each; the halves a little over double that, or about five pounds, giving room for one hundred pounds of honey; but as it is not advisable, as stated elsewhere, to let the bees at any time entirely fill the hive, all the full sections should be removed when the bees commence work on the last ones, which generally, in a hive of this size, amounts to about sixty pounds at a time.

The partly filled sections should be pushed back next to the brood, and the ends filled out with empty ones.

The No. 15 B hive is six inches longer than A, and turns out about one hundred pounds at a time. No. 15 C has six inches more added to its length, and will yield one hundred and thirty to one hundred and forty pounds each filling. They only differ from No. A in having greater capacity.

Taking the honey in this way has no tendency to check the bees in their work, as is the case when top-boxes are removed, but has, on the contrary, the effect to increase their industry. When surplus honey is stored in apartments or boxes separated from the main cluster, it is frequently the case that the bees fail to renew their labors in the empty ones with which they are replaced, and they seldom do so for some length of time.

The position of the entrance of the hive in one end and broadside the comb-sheets, will be objected to by many who have no experience with hives so constructed, but it is the most important point in the construction of the hive. In my first efforts at controlling swarming, I placed the entrance-holes in the middle of the hive on the side, and although I gave abundant room in the same shape as at present, swarming was retarded but little, from the fact that the brooding of the queen near or at the middle of the hive soon pushed a part of the cluster out at the entrance.

When I ascertained the true cause of swarming (as I think I have), as given here, but more fully in a paper read before the North American Bee-keepers' Society, at Cleveland, I was not long in correcting this only defect in the hive, by changing the entrance to one end. A thorough trial of the hive thus arranged has resulted in no instance in swarming. Having entrances in both ends has not been so satisfactory, besides which it makes it inconvenient to manipulate the hive.

I do not claim that this hive will of itself prevent swarming, but by a little attention and care it will be found to accomplish that long desired object. If a natural swarm be put into a No. 15 hive, it will be found that they will most generally cluster at the end over the entrance, and consequently the brood-nest will be established there, the result of which will be a swarm almost, if not quite, as soon as from an ordinary hive of 2,000 cubic inches. For that reason, when a swarm is hived in it, the chamber should have both ends taken off, and should be contracted to nine or ten sections, with the ends closed with the glazed end sections. When the contracted chamber is one-half or two-thirds filled with comb, which may be easily known by looking through the glass, additions of a part or the whole of the removed sections should be made to each end. The brood-nest will thus be established in the center, and will continue there during the season, unless interfered with by the bee-keeper, and the ends will be filled out with the purest of comb-honey, and no swarm will issue so long as the bees have room to work in the ends, and the hive is managed as indicated hereinbefore.

BEE FEEDERS.

Many efforts have been made to get up some arrangement by which bees can be conveniently fed, and a number of them have been patented. None of them answer the purpose perfectly, as they do not reach the cluster of bees and in cold weather are useless. In connection with the Section Bee-Hive, I have perfected an arrangement by which all the difficulties are overcome.

The accompaning cut, Fig. 6, is a representation of it. A hole or mortice, B, is cut in the top piece or bar of a brood-chamber section, about six inches long and one inch wide. Into this hole is fitted the box A, the ends of which are wood, the sides and bottom of No. 10 wire-cloth tacked to the wooden ends. A bag of coarse domestic cotton of the size and shape of the box, with a wire bent around the top a little larger than the hole, to which the cotton bag is fastened, is put into the box and filled with honey or syrup. Under the box is placed a wooden trough to catch any food that may run through faster than the bees take it. The cut represents the box as setting in the trough, but it is better to leave a space of one-half inch between them. If the cotton be thick and closely woven, the trough is useless, as the honey will not run through except as the bees suck it. The space around and below the feeder should be fitted with empty worker-comb, by cutting it in the proper shape and fastening it in with melted resin. For summer feeding, one section may be taken off next to the glass and the feeder section substituted, which may be done without interfering with the honey-boxes. For winter feeding it should be placed in the center of the brood-chamber.

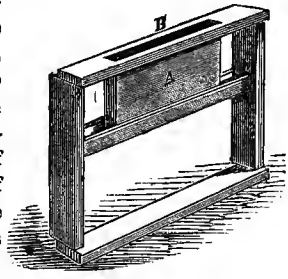


Fig. 6.

ITALIAN BEES.

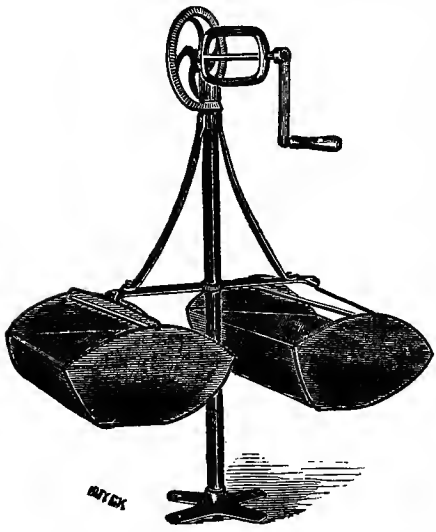
The superiority of the Italian over the common bee of the country is now generally admitted by all who have tried them.

I have no queens for sale except as follows: For single queen in nucleus hive and small colony of bees (which can, by proper management, be built up into a good colony, or if the queen be taken out to put in another colony, will rear another queen), with fertilizing arrangement attached, including my triangular nursery-cage, and also drone and queen-trap, or swarm-arrester, making a complete outfit for queen-rearing, with a sufficient number of drones, $12.

I guarantee their safe arrival and purity. I will not be responsible for their safety if not promptly taken from the express office within twenty-four hours after arrival. I notify all parties, several days in advance, of the time of shipment.

If bees do not arrive in good living order purchasers will notify me at once, stating particulars, that I may send another queen.

ADAIR'S MELIPULT.



This machine consists of a central spindle, set in a base that is screwed fast to the floor or a wide board. The gearing is placed on the top of this spindle, and by turning the crank, the suspended arms are made to revolve around the spindle as rapidly as is necessary. On a hook on the end of each arm is hung a peculiarly-shaped bucket of tin, over which is laid a frame of wire cloth.

The honey-comb is laid on the wire cloth. When the machine is put in motion, the buckets are thrown out and change from a horizontal to a vertical position and the honey is discharged into the buckets. The buckets are easily detached from the machine to be emptied of the honey.

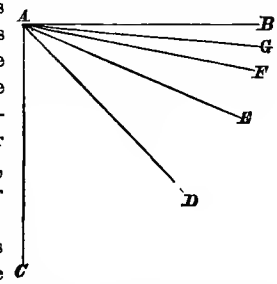
No fastenings are necessary to hold the comb in place, and a number of small pieces may be laid on at one time, and will retain their relative positions, however rapidly the machine is operated.

All of the honey extractors heretofore constructed, place the comb in a vertical position, with the walls of the cells horizontal, and only use the centrifugal force in expelling the honey. My machine brings to bear two forces, viz: gravity and the centrifugal force. The honey is held in the cells by capillary attraction and cohesion. When the honey is thin, but little force is required to overcome the force that thus retains it in the cells; if very thin, the honey will be drawn out by gravitation alone, if the comb is placed in a horizontal position. If the honey be thicker, and the cohesive force stronger than gravitation, as soon as the machine is put in motion, the centrifugal force begins to act, and is added to the force of gravity, and when enough of the former is added to the latter, the honey is ejected.

It is a law of physics that when two forces act upon the same body at the same time and in different directions, as it can not move in two directions at the same time, it takes a direction between the two, and the course it takes is called the resultant motion.

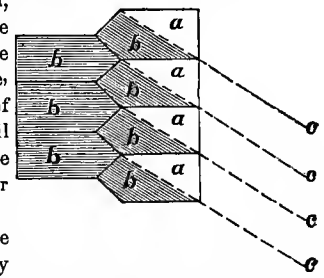
Let *A C*, in the figure below, represent the direction of gravitation, and *A B* that of the centrifugal force. While the machine is at rest, the only force acting on the honey is gravitation, in the direction *A C* vertically. As soon as the machine is put in motion, the centrifugal force begins to act

horizontally. When the velocity of the machine is such as to bring into action a centrifugal force, equal to the force of gravity, the resultant motion of the honey, if ejected, would be in the direction of the line *A D*, or at an angle of forty-five degrees. When the centrifugal force is double the force of gravity, the resultant motion will be in the direction *A E*, at an angle of sixty-seven and one-half degrees; when quadruple, in the direction *A F*, at an angle of seventy-eight and three-fourths degrees; and so on, in the same ratio, that is every time the centrifugal force is doubled the course of the resultant motion divides the space between its last line and the line of the centrifugal force, or true horizontal line *A B*, but never becomes entirely horizontal; or, in other words, the centrifugal force, acting horizontally, *never entirely overcomes the force of gravity.*



In all honey extractors in which the comb is placed in a fixed position, with the walls of the cells horizontal, when we apply these physical laws to them, we find this condition to exist; when sufficient of the centrifugal force is brought into action, to overcome the capillary cohesion, the resultant line of motion is diagonal to the cells, and there is only thrown out of the cells so much honey as is above the line of resultant motion, if drawn so as to touch the lower lip or margin of the cell. But in my extractor the cells are always in the line of resultant motion, and at that point are suddenly and completely emptied.

The accompanying diagram will show my meaning: *a b a b* represent the cells to be emptied, the lines *c c* the direction of resultant motion. All the honey above those lines at *a a* will be ejected, but all below at *b b* will be retained. As the velocity of the machine is increased, more honey is expelled, small particles at a time, like a fine mist or spray; but as the force of gravity is never entirely overcome, it will hold some of the honey in the cells to the last, which the centrifugal force can never draw out.



My Melipult will completely empty the honey with half the motion required by any other, and consequently without breaking down the comb, and as the honey is all or nearly all emptied from the cells at once it has less air bubbles and froth in it, and keeps better.

The machine is all iron, except the buckets, which are of tin.

There is no wood about it to get sour or dirty.

The black grease from the gearing can not fall into the honey.

It is light, only weighing about twenty-eight pounds, and can be carried about with one hand, and shipped for small freight.

It will empty small pieces of comb, as many as can be laid on at one time.

By having buckets made for the purpose, say eight inches square and deep,

with a shallow bucket for each four inches deep, with wire-cloth bottom, to set inside of the deeper ones, and extend half way to the bottom, in which a cloth can be laid, we have a perfect filter, that by pouring dirty honey into it, and revolving rapidly, will force all the pure honey through, leaving the impurities behind. It can be used also in purifying other liquids, and answers an admirable purpose in extracting the juices from berries and other fruits for making jelly, as it leaves no taste of the cloth, as is usually the case when fruit juice is strained through linen or cotton.

PRICE LIST FOR 1872.

HIVES, RIGHTS, AND TERRITORY.

Deed of individual right to make and use any number of hives by one person and in one place,	$5 00
Individual right to use honey-boxes only,	3 00
Right and hive, No. 15 A,	10 00
Right and a sample No. 1 hive,	8 00

County rights from $25 to $100. Township rights, $10 to $25.

Any person selling enough rights in his precinct, township, county, or State, to amount to the price of the same, and sending me the money, shall receive a deed to the territory.

OFFER EXTRAORDINARY.

With a view to introducing my hive into every county in the United States, I will sell to the first applicant from each county, one township, precinct, or civil district corresponding to a township, by whatever name called, provided it does not exceed one-fifth of a county in population, for the sum of $10, and send a No. 15 sample hive for $4. This is a chance for several persons in such a district to club together and get the right very cheap.

ANOTHER OFFER.

Any person sending me $25 will have sent to him an individual right for himself, and full power of attorney authorizing him to sell as many individual rights as he pleases, in his county, during the year 1872, and retain all the proceeds, and the privilege of buying the county at the end of that time with a deduction of $25, and a sample No. 1 hive will be sent without extra charge; $2 extra for No. 15.

Sample hives will be sent at the following prices. Persons not owning rights must add fifty cents for trade mark:

No. 1 hive, with four honey-boxes,	$4 50
No. 15 A,	6 00
No. 15 B,	6 50
No. 15 C,	7 00
Nucleus hive,	2 00
Nucleus hive, with fertilizer for fertilizing queens in confinement, with drone trap and triangular queen cage,	3 00
Drone and queen trap,	50
Queen cage, triangular, pronounced by all the best apiculturists of the country the best thing out,	25
Per dozen,	2 00
Section bee feeder,	50
Adair's Melipult,	14 00
Honey trowel for uncapping sealed honey,	75
Saccharometer,	1 75
Atomizer,	1 75

For fuller list of prices and material, see Charles Tinius' advertisement on last page of cover.

BOOKS—By Mail, Postpaid.

The Annals of Bee Culture for 1869,	$0 50
" " " " 1870,	50
" " " " 1871–2	50
Progressive Bee Culture,	25

BEE JOURNALS.

American Bee Journal,	$2 00
Bee Keepers' Journal and Natural Agriculturist,	1 00
National Bee Journal,	2 00
The three,	4 00

Money may be sent by express or post-office money order (on Cannelton, Indiana), or in registered letter, if inclosed in the presence of the postmaster at my risk.

No article will be sent C. O. D.

Plain directions should be given how the packages are to be marked, and by what route to be sent; and also whether by express or as freight.

When choice of route is left to me, I will use my best judgment, but in all cases the articles are at the purchaser's risk after shipment.

I will correct any mistakes, but will not hold myself bound to do so, if notice is not sent within ten days after receipt of the goods.

Write your name, post-office, county, and State plainly.

In writing, please send me the names of all enterprising bee-keepers of your acquaintance.

Persons writing letters for information or inquiry should send stamp to pay return postage. I will take pleasure in giving any information in my possession, if asked for, and such inquiries as are of general interest I will answer through the "Apiary" department of the *Southern Farmer*, published at Memphis, Tennessee.

Address all letters to

D. L. ADAIR,
Hawesville, Hancock Co., Ky.

THE SACCHAROMETER.

Much of the honey taken by the Melipult is too thin to keep, and it is important to have some means of testing whether it is dense enough. The Saccharometer is an instrument that has been long in use for testing syrups, molasses, and the *mush* in sugar making. It is a glass tube with a bulb on the lower end of it loaded with fine shot, graduated so that in pure water it sinks to zero (0°). As the density is increased by any substance in solution with water, the instrument floats higher. In thin honey it will sometimes mark not more than 25° to 30°. That is too thin and will sour. To be certain that it will keep it should indicate 38° to 42°. Honey that is below this standard may be mixed with that above, until the proper density is attained. Many boil the thin honey, and some recommend heating all of it to make it keep, but any heat applied to honey injures it by driving off the aroma, which is very volatile, and dealers in honey will not buy it.

Thick and thin honey, when put together, will not mix without being stirred. The thin will float on top.

The Saccharometer is an indispensable implement to every bee-keeper who extracts his honey. I can furnish them by express at $1.75 each.

THE ODORATOR, OR ATOMIZER.

This is a little instrument, belonging originally to the ladies' toilet, and used by barbers and perfumers. By simply squeezing an India-rubber ball, any liquid perfume that may be used is thrown out in a fine spray or mist. It answers an admirable purpose in sprinkling bees in many of the manipulations necessary to successful bee culture. It can be used instead of smoke in opening hives, by spraying the bees with sweetened perfumed water. It is useful in uniting bees, as by its use it is an easy matter to give all of them the same scent.

It is a perfect success in introducing queens, as by its use the colony, as well as the queen to be introduced, can be sprayed with anise, mint, or any other perfume, and the queen let loose immediately without danger to her. It is no inconvenience to the bees, as are all the ordinary ways of sprinkling them.

I can furnish them by express at $1.75 each.

WHAT'S ITS NAME.

The machine for separating the honey from the comb has gone by many names, but as yet none has been universally received. *Honey Machine* is indefinite. *Honey Emptying Machine* is inconvenient. The proposition to call it *Hruschka* receives but little favor. *Honey Slinger* savors of slang. *Melextractor*, as proposed by the French, has been adopted most generally, but I conceive that it is an improper name, as the honey is not extracted or drawn out, but is thrown or driven out, or expelled. I have, therefore, given the name Melipult to my machine, as it expels or throws out the honey from the comb, and does not extract or draw it out. The Catapult was an ancient war engine used for throwing stones.

The Hydropult is a small engine used for throwing water. Why not then use the name Melipult to describe a machine for throwing honey from the comb?

CHARLES TINIUS,

CLOVERPORT, BRECKINRIDGE CO., KENTUCKY,

MANUFACTURES

ADAIR'S SECTION BEE-HIVES OF ALL STYLES,

And furnishes material, cut ready for nailing together, for hives and honey boxes.

Price List for 1872.

No. 1 Hive, each	*$4 50*
No. 15 A, Continuous Chamber, 21 Sections in Length	*6 00*
No. 15 B, 25 Sections	*6 50*
No. 15 C, 29 Sections	*7 00*

When ten or more are ordered, a discount of ten per cent. will be made; twenty-five or more, a discount of fifteen per cent. will be made; fifty or more, on special terms.

Material.

Lumber material, for No. 1 hive, complete, including case, brood chamber and boxes, cut ready for nailing, and packed in quantities of ten to twenty-five hives, per hive, $2.50; over twenty-five, five per cent. discount; over fifty, ten per cent. discount. Lumber material for No. 15 A, complete, $3.25; No. 15 B, $3.60; No. 15 C, $4; with the same discount as on No. 1.

Material cut ready for nailing, and packed in barrels or crates, for all the movable inside work of No. 1 or No. 15 A, including sections, guides, and stripe, in packages of ten or more, $1 each. For a less number ten per cent. will be added for extra packing. Add 15 cents for B, and 30 cents for C.

Lumber material for honey boxes, nine full sections, 5 by 6 or 5 by 7, two end sections, back and guides, in lots not less than fifty boxes, 15 cents each; one hundred to five hundred boxes, 14 cents each; five hundred or more, 12½ cents each. If the wooden guides are not wanted, deduct fifteen per cent.

Box stuff for any size box in the same proportion, and a sample box ready made will be sent with each lot ordered. In ordering, state length of box needed, so that side strips may be cut the right length. All sections will be cut one and one-half inches wide, unless otherwise ordered. Extra width in same proportion.

Wire hooks for brood chamber, per one dozen, two of each size, from No. 1 to No. 6, 15 cents; No. 4, per dozen, 15 cents; No. 5 or 6, per dozen, 20 cents. Spiral hooks for sides or doors, per dozen, 25 cents; per one hundred, $1.50.

Persons not owning rights must add 50 cents on each hive for trade-marks, or send $5 with the order for an individual right to use the hive and honey boxes, or $3 for honey-box right.

Nucleus hive for queen raising, $2.

Nucleus hive with fertilizer, for fertilizing queens in confinement, with drone trap, triangular queen cage and feeder, $3.

Drone and queen trap, 50 cents.

Queen cage, triangular, answers all the purposes of a queen nursery, 25 cents each, or $2 per dozen.

Section bee feeder, 50 cents.

Money may be sent by express, or in registered letter, or post-office money order on Cannelton, Indiana.

Plain directions should be given how packages are to be marked, and by what route to be sent, and whether by express or freight.

All articles are at purchaser's risk after shipment.

Nothing sent C. O. D.

CHARLES TINIUS,

Cloverport, Breckinridge Co., Kentucky.

MANN
Spec Coll.
phillips
SF
523
A192